CLAIMS

1. An information recording medium comprising:

a first recording layer in which a first recoding track path for recording at least record information, is formed;

a second recording layer which is disposed on said first recording layer and in which a second recoding track path for recording the record information, is formed in an opposite direction to the first recording track path,

a first buffer area for preventing a recording or reproduction position from deviating from said second recording layer, being formed in advance as a pre-recorded area, of embossed pits or pits obtained by irradiation of recording laser, in one edge portion of said second recording layer.

2. An information recording medium comprising:

a first recording layer in which a first recoding track path for recording at least record information, is formed;

a second recording layer which is disposed on said first recording layer and in which a second recoding track path for recording the record information, is formed in a same direction to the first recording track path,

a first buffer area for preventing a recording or reproduction position from deviating from said first recording layer or said second recording layer, being formed in advance as a pre-recorded area, of embossed pits or pits obtained by irradiation of recording laser, in other edge portions of said first recording layer and said second recording layer.

3. An information recording medium comprising:

a recording layer in which a recording track path for recording record information is formed,

a first buffer area for preventing a recording or reproduction position from deviating from said recording layer, being formed in advance as a pre-recorded area, of embossed pits or pits obtained by irradiation of recording laser, in other edge portion of said recording layer.

4. The information recording medium according to claim 1, wherein

said information recording medium further comprises a control data zone in a lead-in area accessed before the record information is recorded, as another pre-recorded area, and

identification information indicating that said first buffer area is formed in advance, is recorded in said control data zone.

5. The information recording medium according to claim 1, wherein

pre-format address information is recorded in each of said recording layers, and

identification information indicating that said first buffer area is formed in advance, is added to the pre-format address information.

6. The information recording medium according to claim 4, wherein start address information indicating a start position of said first buffer area formed in advance, is recorded in said control data zone, or is added to pre-format address information.

7. The information recording medium according to claim 6, wherein the start address information indicates that said first buffer area is not formed in advance, when having a predetermined value.

8. The information recording medium according to claim 1, wherein (i) said first buffer area is formed in advance of embossed pits, and (ii) a recording film capable of performing additional recording, is laminated thereon.

9. An information recording apparatus (i-a) for recording a first portion of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information, with a recording direction turned around, along the second recording track path, with respect to said information recording medium according to claim 1 constructed such that (iii-1) said first recording layer has a first recording capacity and (iii-2) said second recording layer has a second recording capacity,

said information recording apparatus comprising:

a writing device capable of respectively writing the record information into said first recording layer and said second recording layer as the first portion and the second portion;

a calculating device for calculating a turn-around address on the first recording track path, in turning around from the first recording track path to the second recording track path, in a case (iv-1) where the first portion with an information amount which is equal to or less than the first recording capacity, out of the record information, is written along the first recording track path, and (iv-2) where the second portion with an information amount

which is equal to or less than the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start address information indicating the start address of said first buffer area formed in advance, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling device for controlling said writing device, (i) to write the first portion into said first recording layer along the first recording track path up to the calculated turn-around address, and (ii) to write the second portion into said second recording layer along the second recording track path from a correspondence address in said second recording layer corresponding to the calculated turn-around address in said first recording layer.

10. The information recording apparatus according to claim 9, wherein said controlling device controls said writing device to add the buffer data up to the start position of said first buffer area, in response to a finalize instruction for maintaining compatibility with a read-only or reproduce-only information recording medium.

11. The information recording apparatus according to claim 9, wherein said controlling device controls said writing device to add the buffer data. in order to form at least one portion of a second buffer area, (i) for preventing a recording or reproduction position from deviating from said first recording layer or said second recording layer and (ii) for layer jump, in other edge portions of said first recording layer and said second recording layer, after the writing up to the turn-around address in said first recording layer, and before the writing from the correspondence address in said second recording layer.

12. The information recording apparatus according to claim 9, wherein said controlling device controls said writing device to write the buffer data, in order to form a third buffer area located on one side of the second buffer area, on the basis of (i) the total information amount of the record information, (ii) the start address information indicating the start address of said first buffer area formed in advance, (iii) the first recording capacity, and (iv) the second recording capacity.

13. An information recording apparatus for (i-a) recording a first portion of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information along the second recording track path which is the same recording direction as that of the first recording track path, with respect to said information recording medium according to claim 2 constructed such that (iii-1) said first recording layer has a first recording capacity and (iii-2) said second recording layer has a second recording capacity,

said information recording apparatus comprising:

a writing device capable of respectively writing the record information into said first recording layer and said second recording layer as the first portion and the second portion;

a calculating device for calculating a first recording end edge address on the first recording track path and a second recording end edge address on the second recording track path, in a case (iv-1) where the first portion with an information amount which is equal to or less than the first recording capacity, out of the record information, is written along the first recording

track path, and (iv-2) where the second portion with an information amount which is equal to or less than the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start address information indicating the start address of said first buffer area formed in advance, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling device for controlling said writing device, (i) to write the first portion into said first recording layer along the first recording track path up to the calculated first recording end edge address, and (ii) to write the second portion into said second recording layer along the second recording track path up to the calculated second recording end edge address.

14. The information recording apparatus according to claim 13, wherein said controlling device controls said writing device to write the buffer data, from one of the first and second recording end edge addresses which has a larger address value, to an address value minimum necessary to form a fourth buffer area located on one side of said first buffer area, in response to a finalize instruction for maintaining compatibility with a read-only or reproduce-only information recording medium.

15. An information recording method in an information recording apparatus comprising a writing device (i-a) for recording a first portion of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information, with a recording direction turned around, along the second recording track path, with respect to said information recording medium according to claim 1 constructed such

that (iii-1) said first recording layer has a first recording capacity and (iii-2) said second recording layer has a second recording capacity,

said information recording method comprising:

a calculating process of calculating a turn-around address on the first recording track path, in turning around from the first recording track path to the second recording track path, in a case (iv-1) where the first portion with an information amount which is equal to or less than the first recording capacity, out of the record information, is written along the first recording track path, and (iv-2) where the second portion with an information amount which is equal to or less than the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start address information indicating the start address of said first buffer area formed in advance, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling process of controlling said writing device, (i) to write the first portion into said first recording layer along the first recording track path up to the calculated turn-around address, and (ii) to write the second portion into said second recording layer along the second recording track path from a correspondence address in said second recording layer corresponding to the calculated turn-around address in said first recording layer.

16. An information recording method in an information recording apparatus comprising a writing device (i-a) for recording a first portion of the record information along the first recording track path, and (ii-a) for recording a second portion of the record information along the second recording track path which is the same recording direction as that of the first

recording track path, with respect to said information recording medium according to claim 2 constructed such that (iii-1) said first recording layer has a first recording capacity and (iii-2) said second recording layer has a second recording capacity,

said information recording method comprising:

a calculating process of calculating a first recording end edge address on the first recording track path and a second recording end edge address on the second recording track path, in a case (iv-1) where the first portion with an information amount which is equal to or less than the first recording capacity, out of the record information, is written along the first recording track path, and (iv-2) where the second portion with an information amount which is equal to or less than the second recording capacity is written along the second recording track path, on the basis of (v-1) a total information amount of the record information, (v-2) the start address information indicating the start address of said first buffer area formed in advance, (v-3) the first recording capacity, and (v-4) the second recording capacity; and

a controlling process of controlling said writing device, (i) to write the first portion into said first recording layer along the first recording track path up to the calculated first recording end edge address, and (ii) to write the second portion into said second recording layer along the second recording track path up to the calculated second recording end edge address.

17. A computer program of instructions for recording control and for tangibly embodying a program of instructions executable by a computer provided in the information recording apparatus according to claim 9, the computer program making the computer function as at least one portion of

said controlling device, said calculating device, and said writing device.

18. A computer program of instructions for recording control and for tangibly embodying a program of instructions executable by a computer provided in the information recording apparatus according to claim 13, the computer program making the computer function as at least one portion of said controlling device, said calculating device, and said writing device.